REMARKS

In response to the above Office Action, claim 1 has been amended to include the subject matter of claims 4, 8, 9 and 11, which have been cancelled. Appropriate amendments have also been made to claims 10 and 12. An RCE is being filed with this Reply to enable the Examiner to consider the amended claims.

An object of the present invention is to provide a highly water-resistant polyester nonwoven fabric structure that is excellent in water resistance and has a high heat resistance and a high tensile strength.

The present inventors discovered that the above object can be achieved by forming the laminated nonwoven fabric structure with thermocompressive bonding out of (1) an extremely fine fiber nonwoven fabric layer wherein the fibers are prepared by mixing a polyester resin material having a specific solution viscosity with a specific amount of a polyolefin resin having a specific MFR (melt flow rate) and (2) a filamentary fiber nonwoven fabric layer composed mainly of a polyester resin.

More specifically and as set forth in claim 1, the present invention provides a highly water pressure-resistant polyester nonwoven fabric composed of a laminated nonwoven fabric structure, wherein an extremely fine fiber nonwoven fabric layer formed out of extremely fine fibers composed of a polyester resin material that is mixed with 10% to 50% by weight of a polyolefin resin and having a fiber diameter of 5 μm or less, and a filamentary fiber nonwoven fabric layer composed of a polyester resin containing 7% by weight or less of a polyolefin resin and having a fiber diameter of 7 μm or more are integrated by thermocompressive bonding, wherein the extremely fine fibers forming the extremely fine fiber nonwoven fabric are formed out of a polyester resin material having a solution viscosity from 0.2 to 0.8 η_{sp}/C, the polyolefin resin mixed

with the polyester resin material forming the extremely fine fibers has a MFR (melt flow rate), which is determined under a temperature of 230°C and a load of 21.18 N in accordance with JIS K 7210, of 20 g/10 min or more, a discontinuous phase, in a longitudinal direction, of the polyolefin resin is scattered in a surface of the extremely fine fibers forming the extremely fine fiber nonwoven fabric, and the laminated structure has a water pressure-resistance of 5.2 kPa or more.

In the present invention, the extremely fine fiber nonwoven fabric layer (M layer) contains 10% or 50% by weight of a polyolefin resin and the filamentary fiber nonwoven fabric layer (S layer) contains 7% by weight or less of a polyolefin resin. Therefore, the amount of a polyolefin resin in the M layer is larger than that in the S layer. As a result, the inventive highly water-resistant polyester nonwoven fabric of the invention has excellent water-resistant properties because of a multiplier effect of a structural interruption effect due to the M layer itself and a hydrophobic effect due to the polyolefin resin in the M layer.

In particular, when each of the polyester resin and the polyolefin resin in the fiber forming the M layer has a specific viscosity/MFR and the fiber forming the M layer has a specific amount of the polyolefin resin, the fiber has a special structure wherein the hydrophobic polyolefin resin is distributed as a discontinuous phase, in a longitudinal direction, in the fiber surface of the polyester extremely fine fibers forming the M layer, as shown in Fig. 3 of the present specification, and the discontinuously distributed hydrophobic polyolefin resin functions as hydrophobic points.

In the Office Action, the Examiner continued to reject all of the claims under 35 U.S.C. §103(a) for being obvious over Perkins in view of Bansal.

As pointed out by the Examiner, Perkins teaches the creation of a nonwoven laminate comprising three layers, the first and third layers (S layer) comprising filaments of diameter in excess of 7 microns and the second layer (M layer) consists of filaments with average diameters between 0.1 to 10 microns. Further, Perkins teaches that these layers may be made of a mixture of a polyester resin and a polyolefin resin.

However, Perkins fails to teach the amount of the polyolefin resin in each layer and the rate of distribution of the polyolefin resin between the M layer and the S layer. Perkins also fails to teach the viscosity/MFR of each resin. Furthermore, there is no description and no suggestion regarding the above structure wherein a hydrophobic polyolefin resin is distributed as a discontinuous phase, in a longitudinal direction, in a fiber surface of the extremely fine polyester fibers forming the M layer.

As noted, Bansal teaches a process for making a nonwoven sheet of melt spun fibers comprising at least 30 wt% polyester having a viscosity of 0.40 to 0.60 dl/g in which the polyester may be blended with a polyolefin (e.g., polyethylene) and occupies 75 wt%.

However, the diameter of the melt spun fiber is greater than 5 microns and therefore the nonwoven sheet disclosed in Bansal corresponds to the S layer in the present invention. Further, there is no description and no suggestion regarding a laminated sheet comprising the S layer and the M layer. Therefore, even if Bansal is combined with Perkins, it would not be obvious that the amount of the polyolefin resin in the M layer is larger than that in the S layer, as in the present invention.

Bansal discloses a sheath-core arrangement, a side-by-side arrangement, a segmented pie arrangement and an "islands in the sea" arrangement as an

arrangement of polymer components (column 12, lines 64-65) and the Examiner asserts that the "islands in the sea" arrangement is the same structure as the structure in the present invention. However, the structure in the present invention is not so described and all of the examples of Bansal are a sheath-core arrangement.

Further, the Examiner refers to the method of producing the fibers described in column 2, lines 13 to 36 of Bansal. However, there is no description or suggestion here regarding the viscosity/MFR of the polyolefin resin. As is described above, in order to obtain the above structure of the present invention, it is necessary that in the fiber of the extremely fine fiber layer (M layer) each of the polyester resin and the polyolefin resin has a specific viscosity/MFR and that the fiber has a specific amount of the polyolefin resin. Because Bansal does not disclose the viscosity of the polyolefin resin, the above structure in the present invention cannot be obvious from it.

In summary, neither Perkins nor Bansal disclose the viscosity of the polyolefin resin or that the amount of the polyolefin resin in the M layer is larger than that in the S layer. Since these are key features of Applicants' invention, it is submitted that the Examiner has not sufficiently articulated the reasons why the claimed invention would have been obvious over the combination of Perkins in view of Bansal as required by M.P.E.P. §§2142 and 2143 because even if the references are combined these key features are still lacking. Withdrawal of this combination of references as a ground of rejection of the claims is therefore requested.

It is believed claims 1, 2, 5, 6, 10 and 12-17 are allowable.

Please grant any extensions of time required to enter this response and charge any additional required fees to Deposit Account 06-0916.

Respectfully submitted,

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